ZDHC

ZDHC Manufacturing Restricted Substances List

Version 3.0

Signatory Brands

Chemical Industry

ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) V3.0 Feb 2023 (All rights reserved)

Solution Provider

Textile and Footwear Industry

Associates

1 Background

The ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) is a list of chemical substances banned from intentional use in the processing of textile materials, leather, rubber, foam, adhesives and trims used in textiles, apparel, and footwear industry. Intentional use means the substance used deliberately in a chemical product to achieve a desired look or functionality.

The ZDHC MRSL goes beyond the traditional approaches to chemical restrictions, which only apply to finished products (Restricted Substances List - RSL) and is focused on consumer safety. The MRSL approach also helps protect workers, local communities, and the environment from the possible impacts of harmful chemicals.

Chemical formulations covered by restrictions in the ZDHC MRSL include, but are not limited to, cleaners, adhesives, paints, inks, detergents, dyes, colourants, auxiliaries, coatings and finishing agents used during raw material production, wet processing, process machinery maintenance, wastewater treatment, sanitation, and pest control. ZDHC MRSL limits apply to substances in commercially available formulations, not those from earlier stages of chemical synthesis.

Using chemical formulations that conform to the ZDHC MRSL allows suppliers to assure themselves, and their customers, that banned chemical substances are not intentionally used during production and manufacturing processes.

The ZDHC Roadmap to Zero Programme would like to acknowledge the vital role of the experts comprising the MRSL Council who independently and objectively evaluated the proposed additions/ revisions to the ZDHC MRSL V3.0 and made decisions.

2 Purpose

The ZDHC MRSL offers brands and suppliers a single, harmonised list of chemical substances banned from intentional use during manufacturing and related processes in supply chains of the textile, apparel, and footwear (including leather,rubber and foam) industries (the Industry).

Version 3.0 applies to textiles, leather, rubber, foam and adhesives. Recognising that these materials use different processes, search filters can be used to search the limits for each material.

The ZDHC MRSL does not replace legal or brand-specific restrictions on harmful substances in materials or finished products.

3 NOTES

The ZDHC MRSL 3.0 published by ZDHC Foundation does not guarantee the following:

Compliance with, or to take the place of, legal or regulatory requirements. Examples might include: stricter legal, local or regional regulatory requirements on the use, storage and transport of chemical products; or other requirements relating to the handling and disposal of chemical products, which shall supersede any requirements as set forth in this document.

Compliance with, or conformance to, any national or international environmental or workplace safety requirements, including, but not limited to, relevant regulations and/or standards.

Nor do the ZDHC MRSL 3.0 replace any national or international environmental or workplace safety requirements including, but not limited to, regulations and/ or standards.

The ZDHC MRSL 3.0 is not intended nor can be used as a statement of legal requirements.

ZDHC refers to the UN GHS (Globally Harmonized System of Classification and Labelling of Chemicals) as the internationally recognised standard for hazardous material classification and labelling. All the other National/Regional existing schemes, derived from the implementation of the GHS, have to be considered included in the list of the accepted ZDHC standards for this purpose. To simplify the ZDHC MRSL 3.0 comprehension, ZDHC uses GHS throughout as its reference for Hazard Statements and Pictograms in SDS and labels in order to avoid local variables.

4 DISCLAIMERS

ZDHC has made every reasonable effort to make sure that the content and information contained in the ZDHC MRSL 3.0 is as accurate and correct as possible at the time of publication. ZDHC makes no claims, promises, or guarantees about the accuracy, completeness, or adequacy of the contents of this document.

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For the avoidance of doubt this Disclaimer applies to all related documents produced by ZDHC, specifically: ZDHC Wastewater Guidelines, ZDHC Sludge Reference Document, ZDHC Wastewater and Sludge Laboratory Sampling and Analysis Plan and ZDHC Wastewater Industry Implementation Approach etc.

5 ZDHC MRSL Chapters

5.1 Chapter 1: ZDHC MRSL

This applies to chemical formulations and substances used during the creation and wet processing of textile fibres, and during the creation and processing of (coated) fabrics, leather, rubber, foam and adhesives.

The MRSL substances are listed with applicable CAS numbers and provided with Applicability filters for substrates (Textile, Leather, Polymers -Rubber, Foam, Adhesives), Supplier Guidance, Formulation Limit and Methods of Analysis.

Supplier Guidance includes:

- No intentional use: these substances are banned from intentional use in facilities that process raw materials and manufacture finished products

- Not applicable: these substances are not applicable to the specific substrates

- No restriction: these substances are not restricted for the specific substrates

Formulation limits are concentration limits for the substances in commercial chemical formulations available from chemical manufacturers. These limits ban intentional use while allowing for reasonable expected manufacturing impurities, which should be consistently achievable by responsible chemical manufacturers.

Methods of Analysis describe general techniques of testing and wherever available, specific test methods.

In the ZDHC MRSL Table, R,F,A stands for Rubber, Foam and Adhesives.

5.2 Chapter 2: ZDHC MRSL Candidate List

Substances proposed for addition to the ZDHC MRSL update, as described in the Principles and Procedures, as they lack safer alternatives at scale or more information on the same needs to be collected. Substances on the Candidate List encourages the innovation of alternatives.

5.3 Chapter 3: ZDHC MRSL Archived Substances

Substances without strong evidence of current use in Industry, but with clear evidence of historical use. The Archived Substances should not be reintroduced by a chemical manufacturer in their commercial chemical products. This list should be reviewed by ZDHC Approved MRSL Certifier through the chemical product's Safety Data Sheet or any other relevant document to confirm absence of these substances in the chemical formulation that is being certified for ZDHC MRSL Conformance.

6 Process for ZDHC MRSL Revision

The ZDHC MRSL is a living document and since its initial release in 2015 the ZDHC MRSL has been regularly updated. The update process is described here (https://downloads.roadmaptozero.com/input/ZDHC-MRSL-Principles-and-Procedures)

7 Transition Period

After the release of a new version of the ZDHC MRSL a transition period applies. This lets the Industry prepare for the implementation of the new version. The current transition period is twelve months, beginning on 01 November 2022. During this time, both versions of the ZDHC MRSL remain active and it's possible to certify against them.

https://downloads.roadmaptozero.com/input/ZDHC-MRSL-Industry-Standard-Implementation-Approach

1A. Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs): including all isomers

Potential Uses
APEOs can be used as or found in: detergents, scouring agents, spinning oils, wetting agents, softeners, emulsifier/dispersing agents for dyes and printing formulations, impregnating agents, de-gumming agents / auxiliaries for silk production, dyes and pigment preparations, polyester padding and down/feather fillings.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Nonylphenol (NP) , mixed isomers	Multiple, including 104-40-5 11066-49-2 25154-52-3 84852-15-3	Textile	No intentional use	Sum = 100 mg/kg	ISO 21084
		Leather	No intentional use	Sum = 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 100 mg/kg	
Nonylphenol ethoxylates (NPEO)	Multiple, including 9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0	Textile	No intentional use	Sum = 250 mg/kg	ISO 18254
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Octylphenol (OP) , mixed isomers	Multiple, including 140-66-9 1806-26-4 27193-28-8	Textile	No intentional use	Sum = 100 mg/kg	ISO 21084
		Leather	No intentional use	Sum = 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 100 mg/kg	
Octylphenol ethoxylates (OPEO)	Multiple, including 9002-93-1 9036-19-5 68987-90-6	Textile	No intentional use	Sum = 250 mg/kg	ISO 18254
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	

1B. Anti-microbials and Biocides

Potential Uses
These chemicals have antimicrobial properties, which can be used to preserve formulations, preserve articles to which they are intentionally applied, or provide customers with benefits like odour control or insect repellency.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Dimethylfumarate (DMFu)	624-49-7	Textile	No intentional use	10 mg/kg	ISO 16186:2021
		Leather	No intentional use	10 mg/kg	
		Polymers (R,F,A)	No intentional use	10 mg/kg	

1B. Anti-microbials and Biocides

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
O-Phenylphenol (+salts)	90-43-7	Textile	No intentional use	5000 mg/kg	ISO 22992-1 (Textile), EN 17134 ISO 13365-1 (Leather)
		Leather	Permitted as a preservative up to the formulation limit	5000 mg/kg	
		Polymers (R,F,A)	Not Applicable	Not applicable	
Note: OPP is permitted for use as a preservative in the formulations under BPR PT6.					
Permethrin	52645-53-1	Textile	No intentional use	250 mg/kg (Exemption for mentioned processes)	Solvent extraction, LC MS GC MS
		Leather	No intentional use	250 mg/kg (Exemption for mentioned processes)	
		Polymers (R,F,A)	No intentional use	250 mg/kg (Exemption for mentioned processes)	
Note: In many situations, deliberate use is not permitted. However, it should be noted that, Permethrin is approved for use on wool curtains, carpets, rugs and floor coverings under BPR PT 18. Permethrin is permitted for usage in personal protective equipment (PPE) (EU 2016/425, EPA registered product, APVMA registered product, PMRA registered product, etc.). Additionally, it is sometimes only allowed for specific purposes, such as military ones. All efforts should be made to maximise the chemical finish durability and to minimise losses to the environment.					
Triclosan	3380-34-5	Textile	No intentional use	250 mg/kg	Solvent extraction, LC MS, DAD ISO 22992-2
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1C. Chlorinated Paraffins

Potential Uses
These are occasionally used as flame retardants and PVC additives in certain industries. These are also used as fat liquoring agents in leather processing.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals

1C. Chlorinated Paraffins

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Short-chain Chlorinated Paraffins (SCCPs) (C10-C13)	85535-84-8	Textile	No intentional use	250 mg/kg	ISO 22818:2021
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Medium-chain Chlorinated Paraffins (MCCPs) (C14-C17)	85535-85-9	Textile	No intentional use	250 mg/kg	ISO 22818:2021
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1D. Chlorobenzenes and Chlorotoluenes

Potential Uses
Chlorobenzenes and chlorotoluenes (chlorinated aromatic hydrocarbons) can be used as carriers in the dyeing process of polyester or wool/polyester fibres. They can also be used as solvents. Additionally, they can be found in colourants and specialty chemicals as an impurity.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
1,2-Dichlorobenzene	95-50-1	Textile	No intentional use	500 mg/kg	EN 17137 Confirmation analysis may be required to avoid false positives.
		Leather	No intentional use	500 mg/kg	
		Polymers (R,F,A)	No intentional use	500 mg/kg	
Other isomers of mono-, di-, tri-, tetra-, penta- and hexa-Chlorobenzene and mono-, di-, tri-, tetra- and penta-chlorotoluene	Multiple, including 108-90-7 541-73-1 106-46-7 87-61-6 120-82-1 108-70-3 634-66-2 634-90-2 95-94-3 608-93-5 118-74-1 95-49-8 108-41-8 106-43-4 32768-54-0 95-73-8 19398-61-9 118-69-4 95-75-0 25186-47-4 7359-72-0 2077-46-5 6639-30-1 23749-65-7 21472-86-6 1006-32-2 875-40-1 1006-31-1 877-11-2	Textile	No intentional use	Sum = 200 mg/kg Tetrachlorotoluene and Trichlorotoluene 10 mg/kg each	EN 17137 Confirmation analysis may be required to avoid false positives.
		Leather	No intentional use	Sum = 200 mg/kg Tetrachlorotoluene and Trichlorotoluene 10 mg/kg each	
		Polymers (R,F,A)	No intentional use	Sum = 200 mg/kg Tetrachlorotoluene and Trichlorotoluene 10 mg/kg each	

1E. Chlorophenols

Potential Uses
Chlorophenols are polychlorinated compounds used as preservatives or pesticides. Pentachlorophenol (PCP) and tetrachlorophenol (TeCP) have been used in the past to prevent mould when storing/ transporting, raw hides and leather. They are now regulated and should not be used.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2-Chlorophenol [1]	95-57-8	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
3-Chlorophenol [1]	108-43-0	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
4-Chlorophenol [1]	106-48-9	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,3-Dichlorophenol [1]	576-24-9	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,4-Dichlorophenol [1]	120-83-2	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,5-Dichlorophenol [1]	583-78-8	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,6-Dichlorophenol [1]	87-65-0	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	

1E. Chlorophenols

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
3,4-Dichlorophenol [1]	95-77-2	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
3,5-Dichlorophenol [1]	591-35-5	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,3,4-Trichlorophenol [1]	15950-66-0	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,3,5-Trichlorophenol [1]	933-78-8	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,3,6-Trichlorophenol [1]	933-75-5	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,4,5-Trichlorophenol [1]	95-95-4	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
2,4,6-Trichlorophenol [1]	88-06-2	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	
3,4,5-Trichlorophenol [1]	609-19-8	Textile	No intentional use	Sum (1) = 50 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (1) = 50 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (1) = 50 mg/kg	

1E. Chlorophenols

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2,3,4,5-Tetrachlorophenol [2]	4901-51-3	Textile	No intentional use	Sum (2) = 15 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (2) = 15 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (2) = 15 mg/kg	
2,3,4,6-Tetrachlorophenol [2]	58-90-2	Textile	No intentional use	Sum (2) = 15 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (2) = 15 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (2) = 15 mg/kg	
2,3,5,6-Tetrachlorophenol [2]	935-95-5	Textile	No intentional use	Sum (2) = 15 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	Sum (2) = 15 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (2) = 15 mg/kg	
Pentachlorophenol (PCP)	87-86-5	Textile	No intentional use	5 mg/kg	GC-MS DIN 50009:2021 or EN ISO 17070
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	

1F. Dyes - Allergenic Disperse Dyes

Potential Uses
Disperse dyes are a class of water- insoluble dyes that penetrate the fibre system of synthetic or manufactured fibres and are held in place by physical forces without forming chemical bonds. Disperse dyes are used in synthetic fibre dyeing (e.g. polyester, acetate, polyamide). Restricted disperse dyes are suspected of causing allergic reactions and should no longer be used for dyeing of textiles.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Disperse Blue 7	3179-90-6	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Blue 26	3860-63-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1F. Dyes - Allergenic Disperse Dyes

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Disperse Blue 35	12222-75-2 56524-77-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Blue 102	12222-97-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Blue 106	12223-01-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Blue 124	61951-51-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Brown 1	23355-64-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Orange 1	2581-69-3	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Orange 3	730-40-5	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Orange 37/59/76	13301-61-6	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1F. Dyes - Allergenic Disperse Dyes

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Disperse Red 1	2872-52-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Red 11	2872-48-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Red 17	3179-89-3	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Yellow 1	119-15-3	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Yellow 3	2832-40-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
Note: In addition to having skin sensitising characteristics, C.I. Disperse Yellow 3 is suspected to be carcinogenic.					
C.I. Disperse Yellow 9	6373-73-5	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Yellow 39	12236-29-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1F. Dyes - Allergenic Disperse Dyes

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Disperse Yellow 49	54824-37-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1G. Dyes – Carcinogenic or Equivalent Concern

Potential Uses
Most of these substances are regulated and should no longer be used for dyeing of textiles and leather.
For some dyes, it is not possible to directly detect the dye and it must be done by indirect methods as explained in the DIN standard.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Acid Red 26	3761-53-3	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	Not Applicable		
C.I. Acid Violet 49	1694-09-3	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Blue 26 (with Michler's Ketone > 0.1%)	2580-56-5	Textile	No intentional use	250 mg/kg	DIN 54231 If the dye is detected, then check for the presence of Michler's ketone which is the non-conformance issue.
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Green 4 (Malachite Green Chloride)	569-64-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Green 4 (Malachite Green Oxalate)	2437-29-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1G. Dyes – Carcinogenic or Equivalent Concern

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Basic Green 4 (Malachite Green)	10309-95-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Green 4 leuco base	129-73-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Red 9	569-61-9	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic Violet 14	632-99-5	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Basic violet 3 (with Michler's Ketone > 0.1%)	548-62-9	Textile	No intentional use	250 mg/kg	DIN 54231 If the dye is detected, then check for the presence of Michler's ketone which is the non-conformance issue.
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Direct Black 38	1937-37-7	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	Not Applicable		
C.I. Direct Blue 6	2602-46-2	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	Not Applicable		
C.I. Direct Red 28	573-58-0	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	Not Applicable		

1G. Dyes – Carcinogenic or Equivalent Concern

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
C.I. Disperse Blue 1	2475-45-8	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Blue 3	2475-46-9	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		
C.I. Disperse Orange 11	82-28-0	Textile	No intentional use	250 mg/kg	DIN 54231
		Leather	Not Applicable		
		Polymers (R,F,A)	Not Applicable		

1H. Flame Retardants

Potential Uses
Flame retardant chemicals are deliberately applied to meet legal and contractual flammability standards.
The use of the flame retardants listed below, or any halogenated flame retardant, is not permitted (for fashion, sport or outdoor clothing and apparel and home textiles).
It should be noted that there may be certain critical (technical textile) end uses where legally or contractually mandated standards may only be achieved using these substances (e.g. military, medical, protective clothing, transportation). The formulations will always be deemed ZDHC MRSL NON-CONFORMANT and it is intended that the ZDHC Supplier Platform will appraise the end uses of any flame retardants within an inventory.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2,2-Bis (bromomethyl) -1,3-propanediol (BBMP)	3296-90-0	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Bis (2,3-dibromopropyl) phosphate (BDBPP)	5412-25-9	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1H. Flame Retardants

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Boric acid	10043-35-3, 11113-50-1	Textile	No intentional use	250 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Decabromobiphenyl (DecaBB)	13654-09-6	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Decabromodiphenyl ether (DecaBDE)	1163-19-5	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Diboron trioxide	1303-86-2	Textile	No intentional use	250 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Dibromobiphenyls (DiBB)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Disodium octaborate	12008-41-2	Textile	No intentional use	250 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Disodium tetraborate, anhydrous	1303-96-4, 1330-43-4	Textile	No intentional use	250 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1H. Flame Retardants

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Heptabromodiphenyl ether (HeptaBDE)	68928-80-3	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Hexabromocyclodecane (HBCDD)	3194-55-6	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Hexabromodiphenyl ether (HexaBDE)	36483-60-0	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Monobromobiphenyls (MonoBB)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Monobromodiphenyl ether (MonoBDEs)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Nonabromobiphenyls (NonaBB)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Nonabromodiphenyl ether (NonaBDE)	63936-56-1	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1H. Flame Retardants

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Octabromobiphenyls (OctaBB)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Octabromodiphenyl ether (OctaBDE)	32536-52-0	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Pentabromodiphenyl ether (PentaBDE)	32534-81-9	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tetraboron disodium heptaoxide, hydrate	12267-73-1	Textile	No intentional use	250 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tetrabromobisphenol A (TBBPA)	79-94-7	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tetrabromobisphenol A bis (2,3-dibromopropyl ether)	21850-44-2	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tetrabromodiphenyl ether (TetraBDE)	40088-47-9	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1H. Flame Retardants

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Tri-o-cresyl phosphate	78-30-8	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tribromodiphenyl ethers (TriBDEs)	Multiple	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Trimethyl phosphate	512-56-1	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tris (1-aziridinyl) phosphine oxide (TEPA)	545-55-1	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tris (1,3-dichloro-isopropyl) phosphate (TDCP)	13674-87-8	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tris (2-chloro-1-methylethyl) phosphate (TCPP)	13674-84-5	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Tris (2-chloroethyl) phosphate (TCEP)	115-96-8	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1H. Flame Retardants

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Tris (2,3,-dibromopropyl) phosphate (TRIS)	126-72-7	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	
Trixylyl phosphate (TXP)	25155-23-1	Textile	No intentional use	250 mg/kg	Solvent extraction, GC-MS and/or LC-MS
		Leather	No intentional use	250 mg/kg	
		Polymers (R,F,A)	No intentional use	250 mg/kg	

1I. Glycols / Glycol Ethers

Potential Uses
In apparel and footwear, glycol ethers / glycol esters have a wide range of uses including as solvents for finishing/cleaning, printing agents and dissolving and diluting fats, oils and adhesives (e.g. in degreasing or cleaning operations).

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2-Ethoxyethanol	110-80-5	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
2-Ethoxyethyl acetate	111-15-9	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
2-Methoxyethanol	109-86-4	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	

1I. Glycols / Glycol Ethers

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2-Methoxyethyl acetate	110-49-6	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
2-Methoxypropanol	1589-47-5	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	SEE CANDIDATE LIST	SEE CANDIDATE LIST	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
2-Methoxypropyl acetate	70657-70-4	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg, 1000 mg/kg (Finishing formulations)	
		Polymers (R,F,A)	Not Applicable	Not Applicable	
Bis (2-methoxyethyl) ether	111-96-6	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
Ethylene glycol dimethyl ether	110-71-4	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
Triethylene glycol dimethyl ether	112-49-2	Textile	No intentional use	50 mg/kg	LC-MS, GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	

1J. Halogenated Solvents

Potential Uses
In apparel and footwear, halogenated solvents are used as finishing/ cleaning and printing agents, for dissolving/ diluting fats, oils and adhesives (e.g. in degreasing or cleaning operations).
Formulations containing any of the listed solvents above the published limits are NON CONFORMANT with the ZDHC MRSL. Despite the advancement of water-based systems, there are a small number of solvent-based systems that remain the most prevalent in the industry and ZDHC recognises that it will take time to phase these out completely.
ZDHC guidance is to avoid the deliberate use of listed solvents wherever possible, with a transition to water-based formulations being preferable, and to ensure that worker exposure and emissions are minimised.
It is intended that the ZDHC Supplier Platform will assess the implementation of best practices for emission and exposure control as well as the usage of water-based formulations at a facility.
Note: There are some solvent-based technologies that are generally regarded as having lower overall environmental impacts than aqueous alternatives (e.g. solvent scouring) and every specific scenario will be judged on its merits through the ZDHC Supplier Platform.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals

1J. Halogenated Solvents

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
1,2-Dichloroethane	107-06-2	Textile	No intentional use	5 mg/kg	GC- MS
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Benzyl chloride	100-44-7	Textile	No intentional use	50 mg/kg and 100 mg/kg for dyes	GC-MS with confirmatory LC-MS in the event of a positive detection
		Leather	No intentional use	50 mg/kg and 100 mg/kg for dyes	
		Polymers (R,F,A)	No intentional use	50 mg/kg and 100 mg/kg for dyes	
Methylene chloride	75-09-2	Textile	No intentional use	5 mg/kg	GC-MS
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Tetrachloroethylene	127-18-4	Textile	No intentional use / EC* (Closed-loop solvent scouring)	5 mg/kg	GC-MS
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Trichloroethylene	79-01-6	Textile	No intentional use	40 mg/kg	GC-MS
		Leather	No intentional use	40 mg/kg	
		Polymers (R,F,A)	No intentional use	40 mg/kg	

EC* - Emission and Exposure Controls best practices are in place

1K. Organic Solvents

Potential Uses
In apparel and footwear, VOCs / solvents are used in processes such as coatings and glues/adhesives.
Formulations containing any of the listed solvents above the published limits are NON CONFORMANT with the ZDHC MRSL. Despite the advancement of water-based systems, there are a small number of solvent-based systems that remain the most prevalent in the industry and ZDHC recognises that it will take time to phase these out completely.
ZDHC guidance is to avoid the deliberate use of listed solvents wherever possible, with a transition to water-based formulations being preferable, and to ensure that worker exposure and emissions are minimised.
It is intended that the ZDHC Supplier Platform will assess the implementation of best practices for emission and exposure control as well as the usage of water-based formulations at a facility.
Note: There are some solvent-based technologies that are generally regarded as having lower overall environmental impacts than aqueous alternatives (e.g. solvent scouring) and every specific scenario will be judged in its merits through the ZDHC Supplier Platform.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Benzene	71-43-2	Textile	No intentional use	50 mg/kg	GC-MS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
Cresol (all isomers) o-Cresol m-Cresol p-Cresol	1319-77-3 95-48-7 108-39-4 106-44-5	Textile	No intentional use	500 mg/kg	GC-MS
		Leather	No intentional use	500 mg/kg	
		Polymers (R,F,A)	No intentional use	500 mg/kg	
N,N-dimethylacetamide (DMAC)	127-19-5	Textile	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	GC-MS
		Leather	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
N,N-Dimethylformamide (DMFa)	68-12-2	Textile	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	GC-MS, ISO/TS 16189
		Leather	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	

EC* - Emission and Exposure Controls best practices are in place

1K. Organic Solvents

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
N-Ethyl-2 pyrrolidone (NEP)	2687-91-4	Textile	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	GC-MS
		Leather	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
N-Methyl-2-Pyrrolidone (NMP)	872-50-4	Textile	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	GC-MS, ISO 19070 (GC-MS)
		Leather	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Solvent based PU coating)	1000 mg/kg	
Toluene	108-88-3	Textile	No intentional use / EC* (Solvent based PU coating)	500 mg/kg	GC-MS
		Leather	No intentional use / EC* (Solvent based PU coating)	500 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Solvent based PU coating)	500 mg/kg	

EC* - Emission and Exposure Controls best practices are in place

1K. Organic Solvents

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Xylene (all isomers) o-Xylene m-Xylene p-Xylene	1330-20-7 95-47-6 108-38-3 106-42-3	Textile	No intentional use / EC* (Coating)	500 mg/kg	GC-MS
		Leather	No intentional use / EC* (Coating)	500 mg/kg	
		Polymers (R,F,A)	No intentional use / EC* (Coating)	500 mg/kg	

EC* - Emission and Exposure Controls best practices are in place

1L. Organotin Compounds

Potential Uses
Organotins are a class of chemicals combining tin and organics such as butyl and phenyl groups. Organotins are predominantly found in the environment as antifoulants in marine paints, but they can also be used as biocides (e.g. antibacterials), catalysts in plastic and glue production and heat stabilisers in plastics/rubber. In textiles and apparel, organotins are associated with plastics/rubber, inks, paints, metallic glitter, polyurethane products and heat transfer material.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Dibutyltin (DBT)	Multiple, including 683-18-1	Textile	No intentional use	20 mg/kg	Solvent extraction, GC MS, ISO TS 16179, ISO 22744-1
		Leather	No intentional use	20 mg/kg (*EXCEPTION - 100 mg/kg for Polyurethane based thickeners - See notes below)	
		Polymers (R,F,A)	No intentional use	20 mg/kg	

* In order to be able to optimise performance characteristics of some leather finishes, it is sometimes desirable to use PU thickeners and create formulations on-site rather than purchasing pre-mixed formulations from chemical suppliers. In these instances, there is a more lenient limit of DBT for the thickeners themselves, but the thickeners must not be used in quantities >20% in tailored formulations.

1L. Organotin Compounds

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Dipropyltin compounds (DPT)	Multiple, including 867-36-7	Textile	No intentional use	5 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Mono- and tri- butyltin derivatives	Multiple, including 1118-46-3 1461-22-9	Textile	No intentional use	5 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Mono-, di- and tri-methyltin derivatives	Multiple, including 993-16-8 753-73-1 1066-45-1	Textile	No intentional use	5 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Mono-, di- and tri-octyltin derivatives	Multiple, including 3091-25-6 3542-36-7 2587-76-0	Textile	No intentional use	5 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Mono-, di- and tri-phenyltin derivatives	Multiple, including 1124-19-2 1135-99-5 639-58-7	Textile	No intentional use	5 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	5 mg/kg	
		Polymers (R,F,A)	No intentional use	5 mg/kg	
Tetrabutyltin compounds (TeBT)	Multiple, including 1461-25-2	Textile	No intentional use	1 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	1 mg/kg	
		Polymers (R,F,A)	No intentional use	1 mg/kg	
Tetraethyltin compounds (TeET)	Multiple, including 597-64-8	Textile	No intentional use	1 mg/kg	Solvent extraction, GC MS, ISO TS 16179 Fails must be repeated without derivatization, as a derivatization of any ethyl-tin-compound gives always TeET
		Leather	No intentional use	1 mg/kg	
		Polymers (R,F,A)	No intentional use	1 mg/kg	

1L. Organotin Compounds

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Tetraoctyltin compounds (TeOT)	Multiple including 3590-84-9	Textile	No intentional use	1 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	1 mg/kg	
		Polymers (R,F,A)	No intentional use	1 mg/kg	
Tricyclohexyltin (TCyHT)	Multiple including 3091-32-5	Textile	No intentional use	1 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	1 mg/kg	
		Polymers (R,F,A)	No intentional use	1 mg/kg	
Tripropyltin Compounds (TPT)	Multiple including 2279-76-7	Textile	No intentional use	1 mg/kg	Solvent extraction, GC MS, ISO TS 16179
		Leather	No intentional use	1 mg/kg	
		Polymers (R,F,A)	No intentional use	1 mg/kg	

1M. Other/Miscellaneous Chemicals

These are other chemicals / substances / process with a usage ban.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
(Free) Aniline	62-53-3	Textile	No intentional use	Indigo 2000 mg/kg Other dyes 500 mg/kg	Indigo - Reductive method (ISO 14362) Other - Non-reductive (ISO 14362 without reductive step) (See notes below)
		Leather	No intentional use	Indigo 2000 mg/kg Other dyes 500 mg/kg	
		Polymers (R,F,A)	Not Applicable	Not Applicable	

Used in the manufacture of Indigo and some azo dyes. Residues from manufacturing can remain in the formulation. For all dyes other than indigo, it is important that non-reductive methods are used so that only the free aniline is analysed rather than that which could be formed by the cleavage of a dye molecule. For indigo, aniline can be tied up in insoluble clusters of dye and so a reductive method that fully solubilises the dye and liberates free aniline is used. The levels of aniline in indigo must be achieved by removal of the aniline and not by dilution, with a minimum indigo content of 30% being required.

1M. Other/Miscellaneous Chemicals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2- (2-Aminoethylamino) ethanol (AEEA)	111-41-1	Textile	No intentional use	100 mg/kg	Solvent extraction, LC MS/MS or GC-MS (Substance is not stable in aqueous matrices or solutions)
		Leather	No intentional use	100 mg/kg	
		Polymers (R,F,A)	No intentional use	100 mg/kg	
AEEA is used in chelating agents, surfactants and fabric softeners.					
Bisphenol A (BPA)	80-05-7	Textile	No intentional use	100 mg / kg	Solvent extraction, LC MS/MS, GC MS
		Leather	No intentional use	100 mg / kg	
		Polymers (R,F,A)	No restriction	No restriction	
Bisphenol A (BPA) is a precursor chemical used along with other chemicals to create some plastics and resins. It is commonly used to harden plastics.					
Borate, zinc salt	1332-07-6	Textile	No intentional use	1000 mg/kg	Acid digestion, ICP
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Borate, zinc salt can be used as a flame retardant as well as in paints, pigments and adhesives.					
D4 (Octamethylcyclotetrasiloxane)	556-67-2	Textile	No intentional use	1000 mg/kg	TEGEWA method, Chloroform extraction, GC/MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Cyclic siloxane can be present as contaminants in the formulations that contain silicone, such as softeners.					
D5 (Decamethylcyclopentasiloxane)	541-02-6	Textile	No intentional use	1000 mg/kg	TEGEWA method, Chloroform extraction, GC/MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Cyclic siloxane can be present as contaminants in the formulations that contain silicone, such as softeners.					

1M. Other/Miscellaneous Chemicals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
D6 (Dodecamethylcyclohexasiloxane)	540-97-6	Textile	No intentional use	1000 mg/kg	TEGEWA method, Chloroform extraction, GC/MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Cyclic siloxane can be present as contaminants in the formulations that contain silicone, such as softeners.					
Diazene-1,2-dicarboxamide [C,C`-azodi(formamide)] (ADCA)	123-77-3	Textile	No intentional use	1000 mg/kg	LC/MS, LC/DAD
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Perboric acid, sodium salt	Multiple, including 11138-47-9 15120-21-5 7632-04-04 16940-66-2 13517-20-9 125022-34-6 90568-23-3	Textile	No intentional use	1000 mg/kg	Methanol extraction, ICP
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Quinoline	91-22-5	Textile	No intentional use	1000 mg/kg	DIN 54231, LC-MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
Contaminant in dispersing agents in disperse dyes.					
Silica (particles of respirable size)	14464-46-1	Textile	No intentional use of silica-based materials for sandblasting		Process due diligence, no test method available
		Leather	No intentional use of silica-based materials for sandblasting		
		Polymers (R,F,A)	No intentional use of silica-based materials for sandblasting		
Respirable particles of silica are often generated during the process of sand blasting.					

1M. Other/Miscellaneous Chemicals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Thiourea	62-56-6	Textile	No intentional use	1000 mg/kg	Solvent extraction, LC MS/MS, LC-DAD MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	

In several formulations, thiourea is used to improve solubility. It can be used as a cross-linker.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Titanium Dioxide	13463-67-7	Textile	No intentional use of solid mixtures of TiO2 in powder form where >1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm.	1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm. (Liquid mixtures or emulsions or pastes containing TiO2, having proper GHS/CLP classification, are allowed for use.)	For powder mixtures containing TiO2, the formulator should provide confirmed data to demonstrate conformance with particle size requirements for TiO2.
		Leather	No intentional use of solid mixtures of TiO2 in powder form where >1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm.	1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm. (Liquid mixtures or emulsions or pastes containing TiO2, having proper GHS/CLP classification, are allowed for use.)	
		Polymers (R,F,A)	No intentional use of solid mixtures of TiO2 in powder form where >1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm.	1% (w/w) of TiO2 particles have aerodynamic diameter ≤ 10 µm. (Liquid mixtures or emulsions or pastes containing TiO2, having proper GHS/CLP classification, are allowed for use.)	

1N. Perfluorinated and Polyfluorinated Chemicals (PFAS)

Potential uses
Formulations containing PFAS (Per and Polyfluorinated alkylated substances) are often used for water or stain repellency.
The use of any formulation based on, or including PFAS, including those listed below, is not permitted (for fashion, sport or outdoor clothing and apparel and home textiles).
It should be noted that there may be certain critical (technical textile) end uses where legally or contractually mandated standards may only be achieved using these substances (e.g. military, medical, protective clothing, transportation). The formulations will always be deemed ZDHC MRSL NON-CONFORMANT and it is intended that the ZDHC Supplier Platform will appraise the end uses of any PFAS within an inventory.

Note on PFAS and testing: There are thousands of individual chemicals that are categorised as PFAS but only a few are actually useful in terms of oil / water repellency and their use is always accompanied by the presence of common, known 'marker' chemicals such as those listed below. ZDHC approved MRSL certifiers will check for the deliberate use of PFAS or high levels of contamination of PFAS by testing for the marker chemicals listed below and ,at their discretion, use a screening test for total fluorine (quantification limit: 50mg/kg) followed by confirmatory testing for specific series e.g. the other PFAS mentioned in the PFAS ZDHC Guidance Sheet. ZDHC approved MRSL certifier reserves the right to request or carry out test for any specific PFAS chemical using appropriate test method to check MRSL conformance.

[PFAS Guidance Sheet](https://downloads.roadmaptozero.com/mrsl/guidancesheets/pfas.pdf)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals

1N. Perfluorinated and Polyfluorinated Chemicals (PFAS)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Perfluorobutane sulfonic acid (PFBS)	375-73-5	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
Perfluorooctane sulfonic acid (PFOS) and related susbstances	Multiple including 1763-23-1	Textile	No intentional use	Sum = 2000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	Sum = 2000 µg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 2000 µg/kg	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
Perfluorobutanoic acid (PFBA)	375-22-4	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
Perfluorohexanoic acid (PFHxA) and related substances	Multiple, including 307-24-4	Textile	No intentional use	PFHxA = 25 µg/kg PFHxA-related substances = 1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	PFHxA = 25 µg/kg PFHxA-related substances = 1000 µg/kg	
		Polymers (R,F,A)	No intentional use	PFHxA = 25 µg/kg PFHxA-related substances = 1000 µg/kg	

1N. Perfluorinated and Polyfluorinated Chemicals (PFAS)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Perfluorooctanoic acid (PFOA) and related substances	Multiple including 335-67-1	Textile	No intentional use	PFOA = 25 µg/kg PFOA-related substances = 1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	PFOA = 25 µg/kg PFOA-related substances = 1000 µg/kg	
		Polymers (R,F,A)	No intentional use	PFOA = 25 µg/kg PFOA-related substances = 1000 µg/kg	
Perfluorodecanoic acid (PFDA)	335-76-2	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
4:2 Fluorotelomer alcohols (4:2 FTOH)	2043-47-2	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
6:2 Fluorotelomer alcohols (6:2 FTOH)	647-42-7	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	
8:2 Fluorotelomer alcohols (8:2 FTOH)	678-39-7	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	

1N. Perfluorinated and Polyfluorinated Chemicals (PFAS)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
10:2 Fluorotelomer alcohols (10:2 FTOH)	865-86-1	Textile	No intentional use	1000 µg/kg	LC-MS or GC-MS
		Leather	No intentional use	1000 µg/kg	
		Polymers (R,F,A)	No intentional use	1000 µg/kg	

1O. Phthalates – including all other esters of ortho-phthalic acid

Potential Uses
Esters of ortho-phthalic acid (phthalates) are a class of organic compounds commonly added to plastics to increase flexibility. They sometimes are used to facilitate moulding of plastic by decreasing its melting temperature.
Phthalates can be found in:
- Flexible plastic components (e.g. PVC)
- Print pastes
- Adhesives
- Plastic buttons
- Plastic sleevings
- Polymeric coatings

All esters of ortho-phthallic acid are restricted including those listed below

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
1,2-Benzenedicarboxylic acid, di-C6-8-branched and linear alkyl esters, C7-rich (DIHP)	71888-89-6	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	

1O. Phthalates – including all other esters of ortho-phthalic acid

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	68515-50-4	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	84777-06-0	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Benzyl butyl phthalate (BBP)	85-68-7	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Bis (2-methoxyethyl) phthalate (DMEP)	117-82-8	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di (ethylhexyl) phthalate (DEHP)	117-81-7	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-iso-butyl phthalate (DIBP)	84-69-5	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-iso-decyl phthalate (DIDP)	26761-40-0	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	

1O. Phthalates – including all other esters of ortho-phthalic acid

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Di-iso-nonyl phthalate (DINP)	28553-12-0	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-iso-octyl phthalate (DIOP)	27554-26-3	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-iso-pentyl phthalates (DIPP)	605-50-5	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-n-hexyl phthalate (DnHP)	84-75-3	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-n-octyl phthalate (DNOP)	117-84-0	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-n-pentyl phthalate (DnPP)	131-18-0	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Di-n-propyl phthalate (DPRP)	131-16-8	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	

1O. Phthalates – including all other esters of ortho-phthalic acid

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Dibutyl phthalate (DBP)	84-74-2	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Dicyclohexyl phthalate (DCHP)	84-61-7	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Diethyl phthalate (DEP)	84-66-2	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Diisohexyl phthalate	71850-09-4	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
Dinonyl phthalate (DNP)	84-76-4	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	
n-Pentyl-isopentyl phthalate	776297-69-9	Textile	No intentional use	Sum = 250 mg/kg	GC-MS ISO 14389
		Leather	No intentional use	Sum = 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum = 250 mg/kg	

1P. Polycyclic Aromatic Hydrocarbons (PAHs)

Potential Uses
Oil containing PAHs are added to rubber and plastics as a softener or extender and may be found in rubber, plastics, lacquers, and coatings. Within the footwear producing industry, PAHs are often found in the outsoles of footwear and in printing pastes for screen prints. PAHs can be present as impurities in carbon black dyestuffs.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Benzo[a]pyrene (BaP)	50-32-8	Textile	No intentional use	20 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	20 mg/kg	
		Polymers (R,F,A)	No intentional use	20 mg/kg	
Naphthalene [3]	91-20-3	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Acenaphthene [3,4]	83-32-9	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Acenaphthylene [3,4]	208-96-8	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Anthracene [3,4]	120-12-7	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Benzo[a]anthracene [3,4]	56-55-3	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Benzo[b]fluoranthene [3,4]	205-99-2	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	

1P. Polycyclic Aromatic Hydrocarbons (PAHs)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Benzo[e]pyrene [3,4]	192-97-2	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Benzo[ghi]perylene [3,4]	191-24-2	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Benzo[j]fluoranthene [3,4]	205-82-3	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Benzo[k]fluoranthene [3,4]	207-08-9	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Chrysene [3,4]	218-01-9	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Dibenz[a,h]anthracene [3,4]	53-70-3	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Fluoranthene [3,4]	206-44-0	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Fluorene [3,4]	86-73-7	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	

1P. Polycyclic Aromatic Hydrocarbons (PAHs)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Indeno[1,2,3-cd]pyrene [3,4]	193-39-5	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Phenanthrene [3,4]	85-01-8	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	
Pyrene [3,4]	129-00-0	Textile	No intentional use	Sum (3) = 200 mg/kg	GC-MS AfPS GS 2019
		Leather	No intentional use	Sum (4) = 200 mg/kg	
		Polymers (R,F,A)	No intentional use	Sum (3) = 200 mg/kg	

1Q. Restricted Aromatic Amines (Cleavable from Azo-colourants)

Potential Uses
Azo dyes and pigments are colourants that incorporate one or several azo groups (-N=N-) bound with aromatic compounds. Thousands of azo dyes exist, but only those that degrade to form the listed cleavable amines are restricted. Azo dyes that release these amines are regulated and should no longer be used for dyeing of textiles or leather.
The four substances listed below highlighted with an asterisk are salts.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2-Naphthylamine	91-59-8	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
2,4-Xylidine	95-68-1	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
2,4,5-Trimethylaniline	137-17-7	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	

1Q. Restricted Aromatic Amines (Cleavable from Azo-colourants)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2,6-Xylidine	87-62-7	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
3,3'-Dichlorobenzidine	91-94-1	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
3,3'-Dimethoxylbenzidine	119-90-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
3,3'-Dimethylbenzidine	119-93-7	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4-Aminoazobenzene	60-09-3	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4-Aminobiphenyl	92-67-1	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4-Chloro-o-toluidine	95-69-2	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	

1Q. Restricted Aromatic Amines (Cleavable from Azo-colourants)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
4-Chloroaniline	106-47-8	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
2,4-Diaminoanisol	615-05-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
2,4-Toluenediamine	95-80-7	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4,4'-Methylene-bis-(2-chloroaniline)	101-14-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4,4'-Methylenedi-o-toluidine	838-88-0	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4,4'-Diaminodiphenylmethane	101-77-9	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
4,4'-Oxydianiline	101-80-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	

1Q. Restricted Aromatic Amines (Cleavable from Azo-colourants)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
4,4'-Thiodianiline	139-65-1	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
2-Amino-4-nitrotuluene	99-55-8	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
Benzidine	92-87-5	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
p-Cresidine	120-71-8	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
o-Aminoazotoluene	97-56-3	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
o-Anisidine	90-04-0	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
o-Toluidine	95-53-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	

1Q. Restricted Aromatic Amines (Cleavable from Azo-colourants)

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Salt of 2-Naphthylammonium acetate*	553-00-4	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
Salt of 2,4,5-trimethylaniline hydrochloride*	21436-97-5	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
Salt of 4-chloro-o-toluidinium chloride*	3165-93-3	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	
Salt of 4-methoxy-m-phenylene diammonium sulphate*	39156-41-7	Textile	No intentional use	150 mg/kg	ISO 14362
		Leather	No intentional use	150 mg/kg	
		Polymers (R,F,A)	No intentional use	150 mg/kg	

1R. Total Heavy Metals

The formulation limits for As, Cd, Hg, Pb, and Cr (VI) in the list below apply to all types of formulation. When a limit for pigments is specific and differs from the general limit, it is denoted by brackets. The formulation limits for Sb, Cr, Ba, Se, Sn, Ni, Cu, Co and Ag only apply to dye and/or pigment formulations. Any differences between limits for dyes and pigments are indicated in the formulation limit column. The limits for the heavy metals do not apply to colourants containing a listed metal as an inherent compositional part (e.g. metal-complex colourants, the double salts of certain cationic colourants or extenders like barium sulfate). Wet processors must be aware of the metal limits in the ZDHC wastewater guidelines as well as the brand RSL limits with regard to extractable metals from dyed materials when using any colourant that has listed metals as an inherent compositional part. Where RSL and/or wastewater issues are observed, wet processors should discuss this with supply chain partners.

Potential Uses
Although typically associated with leather tanning, chromium VI also may be used in the dyeing of wool (after chroming process).

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Antimony (Sb)	7440-36-0	Textile	No intentional use	Dye 50 mg/kg Pigment 250 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dye 50 mg/kg Pigment 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Dye 50 mg/kg Pigment 250 mg/kg	

1R. Total Heavy Metals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Arsenic (As)	7440-38-2	Textile	No intentional use	50 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	50 mg/kg	
		Polymers (R,F,A)	No intentional use	50 mg/kg	
Barium (Ba)	7440-39-3	Textile	No intentional use	Dyes and Pigments 100 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes and Pigments 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes and Pigments 100 mg/kg	
Cadmium (Cd)	7440-43-9	Textile	No intentional use	20 mg/kg (50 mg/kg for pigments)	Acid digestion, ICP/AAS
		Leather	No intentional use	20 mg/kg (50 mg/kg for pigments)	
		Polymers (R,F,A)	No intentional use	20 mg/kg (50 mg/kg for pigments)	
Chromium (Cr)	7440-47-3	Textile	No intentional use	Dyes and Pigments 100 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes and Pigments 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes and Pigments 100 mg/kg	
Chromium (VI)	18540-29-9	Textile	No intentional use	10 mg/kg	HPLC / DAD Ion chromatography (IC) with UV detection
		Leather	No intentional use	10 mg/kg	
		Polymers (R,F,A)	No intentional use	10 mg/kg	
Cobalt (Co)	7440-48-4	Textile	No intentional use	Dyes 500 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 500 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 500 mg/kg	

1R. Total Heavy Metals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Copper (Cu)	7440-50-8	Textile	No intentional use	Dyes 250 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 250 mg/kg	
Lead (Pb)	7439-92-1	Textile	No intentional use	100 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	100 mg/kg	
		Polymers (R,F,A)	No intentional use	100 mg/kg	
Mercury (Hg)	7439-97-6	Textile	No intentional use	4 mg/kg (25 mg/kg for pigments)	Acid digestion, ICP/AAS
		Leather	No intentional use	4 mg/kg (25 mg/kg for pigments)	
		Polymers (R,F,A)	No intentional use	4 mg/kg (25 mg/kg for pigments)	
Nickel (Ni)	7440-02-0	Textile	No intentional use	Dyes 250 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 250 mg/kg	
Selenium (Se)	7782-49-2	Textile	No intentional use	Dyes 20 mg/kg Pigments 100 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 20 mg/kg Pigments 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 20 mg/kg Pigments 100 mg/kg	
Silver (Ag)	7440-22-4	Textile	No intentional use	Dyes 100 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 100 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 100 mg/kg	

1R. Total Heavy Metals

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
Tin (Sn)	7440-31-5	Textile	No intentional use	Dyes 250 mg/kg	Acid digestion, ICP/AAS
		Leather	No intentional use	Dyes 250 mg/kg	
		Polymers (R,F,A)	No intentional use	Dyes 250 mg/kg	

1S. UV Absorbers

Potential Uses
To make the formulations stable to the effects of UV light or sunlight, UV absorbers are used.

Substance	CASNO	Applicability	Supplier Guidance	Formulation Limit	General Techniques for Analysing Chemicals
2-Benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	3846-71-7	Textile	No intentional use	1000 mg/kg	Solvent extraction, LC MS/MS, GC MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
2,4-Di-tert-butyl-6- (5-chlorobenzotriazole-2-yl) phenol (UV-327)	3864-99-1	Textile	No intentional use	1000 mg/kg	Solvent extraction, LC MS/MS, GC MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
2- (2H-benzotriazol-2-yl) -4,6-ditertpentylphenol (UV-328)	25973-55-1	Textile	No intentional use	1000 mg/kg	Solvent extraction, LC MS/MS, GC MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	
2- (2H-benzotriazol-2-yl) -4-(tert-butyl) -6- (sec-butyl) phenol (UV-350)	36437-37-3	Textile	No intentional use	1000 mg/kg	Solvent extraction, LC MS/MS, GC MS
		Leather	No intentional use	1000 mg/kg	
		Polymers (R,F,A)	No intentional use	1000 mg/kg	

2A. Bisphenols

Substance	CASNO	Intent
Bisphenol AF Bisphenol F Bisphenol S	1478-61-1 620-92-8 80-09-1	Numerous bisphenols, including those listed, are under investigation; based on the information available and their legal status, they may be added to the main list of ZDHC MRSL version 4.0 in the future.

2B. Ethoxylated Tallow Amine

Substance	CASNO	Intent
Polyethoxylated tallow amine	61791-26-2	More information is required on specific substances in this group of chemicals to make a jugment on restrictions

2C. Formaldehyde

Potential Uses
Formaldehyde can be used or present in many types of formulations such as fixatives, resins and binders.

Substance	CASNO	Intent
Formaldehyde	50-00-0	Where formulations that contain formaldehyde are used, it is expected that appropriate exposure and emission controls are employed. In version 4 of the ZDHC MRSL, it is intended to introduce a maximum allowable limit of 250 mg/kg formaldehyde for the majority of formulations and appropriate test methods for leather and textile formulations will need to be determined. For formulations that are known to contain formaldehyde at higher levels but represent state-of-the-art technology, such as non-iron and easy to iron finish formulations or reactive organic / resin tanning agents, it is intended to introduce a limit of 1000 mg/kg in conformance with hazard labelling obligations.

2D. Phenol

Potential Uses
Phenol is not deliberately used in textiles or footwear but trace amounts of phenol can be found in many chemical formulations.

Substance	CASNO	Intent
Phenol	108-95-2	ZDHC is looking for safe limits for phenol as a contaminant in textile chemical formulations.

2E. Potassium Permanganate

Potential Uses
Potassium Permanganate is primarily used for localised bleaching of denim using a spraying process.

Substance	CASNO	Intent
Potassium permanganate	7722-64-7	Potassium permangante must never be used without appropriate engineering controls (such as water curtains and localised extraction) and workers must always use appropriate personal protective equipment. Suppliers are strongly encouraged to evaluate alternatives to manual spraying of potassium permanganate - such as lasers, robotised spraying or safer chemical alternatives

2F. Solvents

Potential Uses
There are many uses of solvents including cleaning, coatings, prints.
Many solvents are restricted in the main list of the ZDHC MRSL. It is strongly advised that suppliers actively seek safer alternatives to the solvents listed in the candidate list as these may be placed on the main list in future versions of the ZDHC MRSL.

Substance	CASNO	Intent
2-Methoxypropanol	1589-47-5	It is intended to introduce a limit for leather formulations in the ZDHC MRSL version 4.
Methanol	67-56-1	Methanol is a concern because of its toxicity and in ZDHC MRSL version 4.0 it is intended to introduce maximum allowable limits and encourage substitution by safer solvents, which in many cases will be ethanol. However, we are aware that human consumption of industrial ethanol can be a problem and there is a requirement in some jurisdictions for industrial ethanol to be deliberately 'tainted' with methanol to make it undrinkable. This will need to be considered as we draw up recommendations.

2G. Total Heavy Metals

Potential Uses
In addition to being used in dyes and pigments, metals are used as raw material for trims and other components.

Substance	CASNO	Intent
Multiple	Metals (Non-dye /pigment)	Studies on usage patterns of metal containing chemicals and formulations and the potential effect of restrictions are will be monitored on an on-going basis and additions made to the main list as appropriate.

3A. Dyes - Carcinogenic or Equivalent Concern

Potential Uses
Most of these substances are regulated and should no longer be used for the dyeing of textiles.

Substance	CASNO	Supplier Guidance
C.I. Solvent Yellow 14	842-07-9	No intentional use
C.I. Solvent Yellow 2	60-11-7	No intentional use
D&C Red No. 19	81-88-9	No intentional use

3B. Dyes - Navy Blue Colourant

Potential Uses
Navy Blue Colourant is regulated and should no longer be used for the dyeing of textiles.

Substance	CASNO	Supplier Guidance
Component 1: C39H23 ClCrN7O12S.2Na	118685-33-9	No intentional use
Component 2: C46H30 CrN10O20S2.3Na	Not allocated	No intentional use

3C. Other/Miscellaneous chemicals

Potential Uses
Dye

Substance	CASNO	Supplier Guidance
Auramine hydrochloride	2465-27-2	No intentional use

3D. Solvents

Potential Uses
In the past, it was used to make several types of polymers, resins and textiles, but its use is now highly restricted.

Substance	CASNO	Supplier Guidance

3D. Solvents

Substance	CASNO	Supplier Guidance
Bis (chloromethyl) ether	542-88-1	No intentional use